

READ BEFORE USING THE PRODUCT

1ch-Thermocouple Transmitter

MRS-101B-T

Thank you for purchasing this KYOWA's product.  
Read this document and instruction manual carefully in order to make full use of the high-performance capabilities of the product. Do not use the product in methods other than described in this document and instruction manual.

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The contents of this instruction manual are subject to change without notice.  
For the latest information, refer to the KYOWA website.  
Be sure to abide by the safety precautions and other notes provided in this document and instruction manual.

Standard Accessories

The following standard accessories are packed with the MRS-101B-T.  
When unpacking, check the contents to ensure that all accessories are packed.

| Name                                               | Quantity |
|----------------------------------------------------|----------|
| Thermocouple adapter (ADP-11T)*                    | 1        |
| JCIS10-70 Miniature Screw (M2x4)*                  | 1        |
| Battery holder (AAA cell×2) for checking operation | 1        |
| ID label                                           | 1        |
| Product Warranty                                   | 1        |

\*Attached to the transmitter body

Information Service

On our website, you can check the catalogs, Instruction manuals, CAD data and update information etc.  
The detailed handling method is described in the instruction manual, so please use it after reading the latest instruction manual carefully.

[https://www.kyowa-ei.com/eng/product/category/acquisition/s\\_mrs-100\\_series/index.html](https://www.kyowa-ei.com/eng/product/category/acquisition/s_mrs-100_series/index.html)

Safety Precautions (Be sure to read the safety precautions before use.)

This product complies with the specifications listed in "Product Specifications" on instruction manual. Avoid using the product in environments that depart from the applicable specifications. Failure to observe this precaution may result in malfunctions.

● **Prior to use**  
To ensure safe use of this product, be sure to read the safety precautions before use. Kyowa Electronic Instruments Co., Ltd., assumes no liability for any damage resulting from the user's failure to comply with the safety precautions.  
The following symbol is used to help ensure safe use of the product:

|                                                                                     |                                                                                                                                                                       |
|-------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | Indicates the operator must refer to an explanation in the INSTRUCTION MANUAL in order to avoid the risk of injury or death of personnel or damage to the instrument. |
|-------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|

● **Warning and Caution indicators**  
The following symbols are used to draw attention to important issues and to help ensure safe use of the product:

|                                                                                     |                |                                                                              |
|-------------------------------------------------------------------------------------|----------------|------------------------------------------------------------------------------|
|  | <b>WARNING</b> | Improper use of the system may result in death or severe injury.             |
|  | <b>CAUTION</b> | Improper use of the system may result in injury and/or damage to the system. |

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|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | <b>WARNING</b> |
| <ul style="list-style-type: none"><li>● <b>Power supply.</b><ul style="list-style-type: none"><li>• To prevent fire hazards, before turning on the product, make sure the power supply voltage specified for the product matches the local line voltage.</li><li>• Connecting the power polarity in reverse may cause accidents or malfunctions. Be sure not to do this.</li></ul></li><li>● <b>Environments containing inflammable substances.</b><br/>To prevent the risk of fire and/or explosion, do not use the product in environments containing inflammable gas, vapor, or dust.</li><li>● <b>In the event of problems.</b><br/>If abnormalities such as smoke, abnormal odor, or abnormal noise occur, immediately turn off the power, disconnect the power cable from the main unit, and stop using it. Also, do not install the instrument on or near flammable materials to prevent a fire when an abnormality occurs.</li><li>● <b>Connecting and disconnecting adapter</b><br/>Before connecting/disconnecting adapter, turn off the power to the instrument and connected devices and ground the GND terminal. Failure to do so may cause an electric shock, performance degradation, or malfunctions.</li></ul> |                |

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| <ul style="list-style-type: none"><li>● <b>Connecting and disconnecting cables</b><br/>Before connecting/disconnecting cables, turn off the power to the instrument and connected devices. Failure to do so may cause an electric shock, performance degradation, or malfunctions.</li><li>● <b>Location of this product</b><ul style="list-style-type: none"><li>• Never use the product in medical facilities. Also use the product away from the implantable pacemaker unit. Doing so may interfere with medical devices, posing a life-threatening risk.</li><li>• Never use the product at airports or in aircrafts. Doing so may cause airport equipment to malfunction, posing a life-threatening risk.</li></ul></li><li>● <b>Concomitant use of conservation measures</b><br/>If there is a possibility that a secondary disaster may occur in the system due to a failure of the instrument, be sure to use another technical conservation measure.</li><li>● <b>Do not disassemble or modify the product.</b><br/>Failure to observe this precaution can result in electric shock or malfunctions. Attempting to disassemble or modify the product will invalidate the warranty.</li><li>● <b>Handling of Batteries</b><ul style="list-style-type: none"><li>• If use primary batteries, do not recharge the primary batteries.</li><li>• If use secondary batteries, If use secondary batteries, charge the battery with the charger specified for the battery to be used.</li><li>• Connect positive (+) and negative (-) terminals of the batteries correctly. It may cause Liquid leakage, fever, ignite or explosion.</li><li>• Do not heat the batteries or throw the batteries into fire. It may cause Liquid leakage, fever, ignite or explosion.</li><li>• Do not short-circuit positive (+) and negative (-) terminals of the batteries. It may cause fever or ignite due to a rush current.</li><li>• if connecting batteries in parallel, use diodes or other means to prevent the batteries from being inadvertently charged.</li><li>• Using the batteries at temperatures outside of the manufacturer's specified range, may lower the performance and/or the life and cause liquid leakage, fever, or explosion.</li></ul></li><li>● <b>Installation</b><ul style="list-style-type: none"><li>• If installing this product, place it on a flat surface.</li><li>• If installing this product on a rotating body, install a safety cover to secure safety from blown parts.</li><li>• If installing this product with screws, install the transmitter with the specified screws and torque.</li></ul></li></ul> |                |

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| <ul style="list-style-type: none"><li>● <b>Use the product in a temperature range of the specified range.</b><br/>Using the product at temperatures outside of the specified range, may lower product performance or result in malfunctions. Also, using batteries at temperatures outside of the manufacturer's specified range, may lower the performance and/or the life and cause liquid leakage, fever, or explosion.</li><li>● <b>Use the product in a relative humidity range of 20% to 85 %.</b><br/>Using the product in environments in which the relative humidity falls outside the specified range, may degrade product performance or result in malfunctions.</li><li>● <b>Take care of condensation after an abrupt change in the environment.</b><br/>Abrupt changes in ambient temperature, such as during transportation, may cause condensation, which can degrade performance or cause malfunctions. Make sure that there is no condensation before using the instrument.</li><li>● <b>Avoid exposing the product to liquid.</b><br/>The product is not waterproof or drip-proof. Make sure no liquids come into contact the product; otherwise, electrical leakage or malfunctions may result.</li><li>● <b>Take care when operating the product in locations where the product may be subject to severe impact or vibration.</b><br/>Continuous vibration or severe impact may result in performance degradation or malfunctions. Also, when using in an environment with impact or vibration, please fix the chassis and connection cable.</li><li>● <b>Avoid using the product in the presence of strong electromagnetic fields.</b><br/>Use the product only in environments in which magnetic fields will not disrupt computer operations. Performance degradation, erratic operation, or malfunctions may occur if the product is used near radio equipment, microwave ovens, electric furnaces, or other equipment generating strong electromagnetic fields.</li><li>● <b>Pay attention to static electricity.</b><br/>It may cause damage due to static electricity. Before touching the equipment, touch a metal object to discharge static electricity.</li><li>● <b>Avoid using the product under poor power supply conditions.</b><br/>Failure to observe this precaution may result in performance degradation, erratic operations, or malfunctions. Be sure to use a power supply that does not emit noise or produce risk of instantaneous power outages.</li><li>● <b>Avoid installing sensors near a welding machine or performing measurements near a welding machine.</b><br/>Failure to observe this precaution may result in output abnormalities, erratic operations, or malfunctions.</li><li>● <b>When using or storing in an environment exposed to dust or corrosive gas, protect the opening with a connector cap.</b><br/>It may cause performance degradation or malfunctions. If dust gets inside, performance decreases. Make sure that dust does not enter during use as well as during storage.</li><li>● <b>If the product is used or stored in a place near the sea, take appropriate measures to protect the product from exposure to outside air.</b><br/>Failure to observe this precaution may result in performance degradation or malfunctions.</li></ul> |                |

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| <ul style="list-style-type: none"><li>● <b>Take care when operating this product in high or low pressure environments.</b><br/>Failure to observe this precaution may result in malfunction, performance degradation, or failure.<br/>This product is designed to be used under pressure of the standard atmosphere.</li><li>● <b>After power is turned OFF, wait at least 5 seconds before turning ON power once again.</b><br/>If power is turned on again within 5 seconds or if the power is repeatedly turned ON and OFF, the product may cause performance deterioration or failure due to the inrush current generated by the product being turned on.</li><li>● <b>Allow the product to warm up before use.</b><br/>After the power ON, always preheat the product for approximately 1 hour.</li><li>● <b>Do not pull on or apply excessive tension to the cables.</b><br/>Lay the cables with a certain safety margin of length to avoid subjecting the connections to excessive force. Applying excessive tension to a cable may result in abnormal output, conductor damage, or connector damage.</li><li>● <b>Wireless communication</b><br/>This product operates on the 2.4 GHz band, which wireless LAN, Bluetooth®, and microwave ovens also use. Devices on the wireless LAN or on other radio waves may generate electromagnetic interference that causes wireless communication errors in this product. Before using this product, check to confirm that there are no such devices nearby. In addition, note that the wireless LAN and Bluetooth® functions of the computer on which the Setting Software for this product is installed may generate electromagnetic interference. When controlling this product via the computer, turn off the computer's wireless LAN and Bluetooth® functions.</li><li>● <b>Location of this product</b><ul style="list-style-type: none"><li>• Do not use the product where use of wireless devices, such as mobile phones, is prohibited.</li><li>• Use the product at the altitude up to 2,000 m.</li></ul></li><li>● <b>Clean the product as needed.</b><br/>When the product becomes dirty, clean with a soft, dry cloth.</li></ul> |                |

Notations used in the Manual

The following notations are used in the manual for convenience.

- **Names described on the panel surface**  
Names described on the panel surface are expressed in double quotation mark " ".
- **Cautionary and reference notes**  
The notations below are used to attract your attention to important cautionary and reference notes when handling the product.

Examples of cautionary notations

|                                                                                       |                                                                                                                          |
|---------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------|
|  | <b>CAUTION</b><br>Describes cases where incorrect handling could result in physical damage (product malfunctions, etc.). |
|---------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------|

|                                                                                       |                                                                             |
|---------------------------------------------------------------------------------------|-----------------------------------------------------------------------------|
|  | <b>NOTE</b><br>Describes important information pertaining to product usage. |
|---------------------------------------------------------------------------------------|-----------------------------------------------------------------------------|

Example of a reference note

|                                                                                       |                                                |
|---------------------------------------------------------------------------------------|------------------------------------------------|
|  | Describes information useful for product usage |
|---------------------------------------------------------------------------------------|------------------------------------------------|

|                                                                                                                                                                                |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Surface appearance</b>                                                                                                                                                      |
| In the manufacturing process, some products have a little uneven surface, rough coating and color.<br>It does not affect the quality, performance, or strength of the product. |

Outline of product

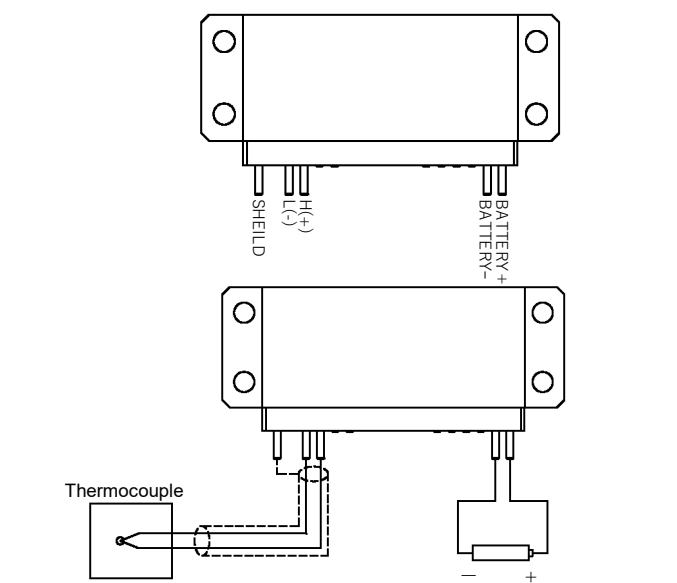
The product is a Transmitter used to wirelessly transmit the measured value with Thermocouple attached to a rotary object, etc. The product is a telemeter to meet the strict system requirements and conditions (Vibration and shock resistance, small size for narrow space, high stability over the wide operating temperature range and low current consumption to get long time battery usage).

- Thin (7 mm) enough for narrow space
- Minimum power supply: 2.2 VDC by two AAA size batteries (eneloop®)
- Continuous operation time: Approx. 45 hours with the two AAA size batteries (alkaline)
- Centrifugal acceleration limit: 3000G

|                                                                                    |                                                                                                                                                                                                                                                                                                                |
|------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | <b>CAUTION</b> <ul style="list-style-type: none"><li>• The catalog value of centrifugal acceleration resistance is the value when installed with our specified screws and torque.</li><li>• If installing this product on a rotating body, install a safety cover to secure safety from blown parts.</li></ul> |
|------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

Connection

Wire as shown below.

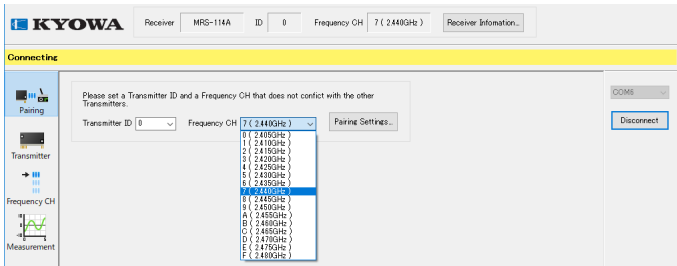


|                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|-------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | <b>NOTE</b> <ul style="list-style-type: none"><li>• Be careful not to incorrectly wire the Thermocouple.<ul style="list-style-type: none"><li>+ side input : H terminal (+IN)</li><li>- side input : L terminal (-IN)</li><li>shielded cable : S terminal (SHIELD)</li></ul></li><li>• The Adapter can be removed for replacement. To reconnect it, solder the pins on the Adapter.</li><li>• Avoid exposing the Adapter to excessive solder and heat from the soldering iron.</li><li>• Keep the thermocouple wire short. Long wiring may introduce noise into thermocouple signal and negatively affect signal transmission and reception.</li><li>• Keep the battery wire short. Long wiring may negatively affect signal transmission and reception.</li><li>• Connecting the power polarity in reverse may cause accidents or malfunctions. Be sure not to do this</li></ul> |
|-------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                       |
|---------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | <b>CAUTION</b> <ul style="list-style-type: none"><li>• Wire the devices so as to avoid disconnection if the transmitter, thermocouple, battery, or respective wiring is twisted or vibrates.</li><li>• The included battery holder, which houses two AAA-cell batteries, is not designed to withstand vibration, impact, or centrifugal force. Use the batteries in the holder only for checking operation.</li></ul> |
|---------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

Preparation of measurements

For proper use of the transmitter, the frequency



**NOTE**

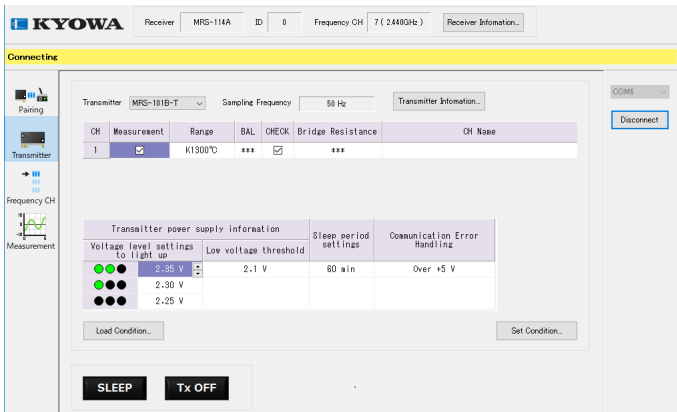
- In the case of using multiple pairing, transmitter ID and Frequency CH should not overlap with other pairing.
- Transmitter ID and Frequency CH is important information for signal communication. So, Transmitter ID and Frequency CH should be managed strictly.
- For accurate [Pairing settings], distance of transmitter and receiver should be within 50cm. [Pairing settings] must be performed by each pair of transceivers, when several pairs of them are used. For details, please refer to the Setting Software (MRS-10B) instruction manual.

Label is applied onto transmitter body to write ID. Write ID on label with pen. Spare label is packed with transmitter.

**CAUTION**

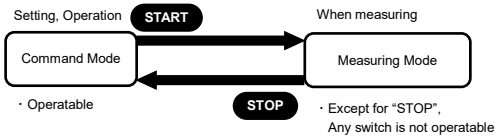
If attaching the ID label to the transmitter, do not use it in an environment subject to centrifugal acceleration such as a rotating body.

- **Measurement range settings**  
By selecting the [Transmitter] tab from the tool bar, measurement range can be set.

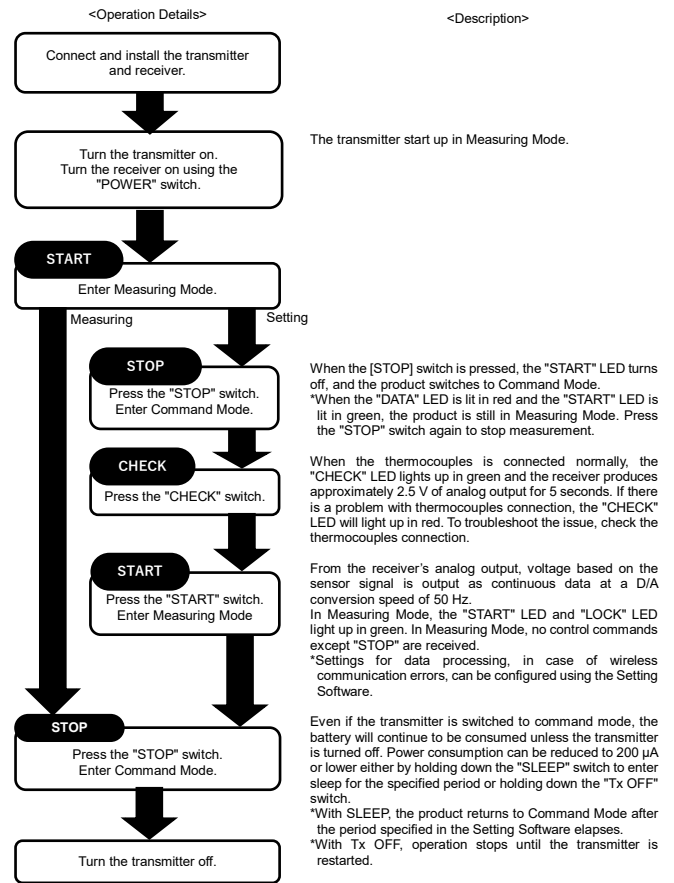


**Operation up to the measurement**

In this measurement, there are two different modes, 'Measuring Mode' and 'Command Mode'. In 'Command Mode', measurement range can be set, and by using "CHECK", "START" switch, every commands of receiver are operable. In Measuring Mode, receiver outputs measurement data from transmitter with analog output. Except for "STOP" switch, any commands cannot be operated. Command Mode and Measuring Mode can be switched by "START" and "STOP" switch.



After preparation, computer with the Setting Software should disconnect from receiver. After wiring transmitter and setting receiving antenna, operation stated below enables transmitter's measurement data to be outputted from receiver as analog output. Analog output from receiver can be recorded with data logger prepared by users.



**Transmitter installation**

Use the screws shown in the following table for fixing the transmitter and adapter and for mounting the transmitter body. Install the transmitter with the specified torque.

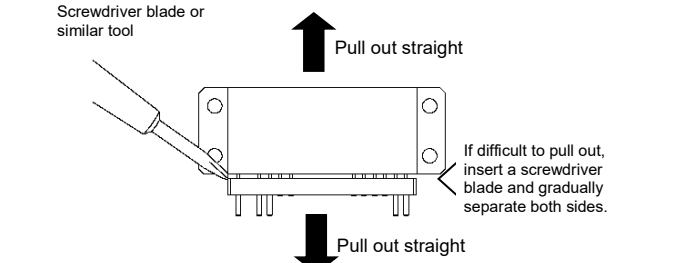
| Mounting object | Thermocouples adapter               |                                | Fixing surface                         |  |
|-----------------|-------------------------------------|--------------------------------|----------------------------------------|--|
|                 | Type                                | JCIS10-70 Miniature Screw (M2) | Hexagon socket head cap Screw (M2.5)   |  |
| Screw           | Material                            | SWCH                           | SCM435 (Tensile strength ranking 10.9) |  |
|                 | Size                                |                                |                                        |  |
|                 | Torque to the Transmitter Main Body | 0.1N·m                         | 0.9N·m                                 |  |

**CAUTION**

- If installing this product, place it on a flat surface. If the transmitter is installed on a warped or uneven surface, it may cause damage or cracks in the body of the transmitter.
- If exceeding the maximum torque, it may cause damage or cracks in the body of the transmitter.
- Wire the devices so as to avoid disconnection if the transmitter, strain gage, battery, or respective wiring is twisted or vibrates.
- The catalog value of centrifugal acceleration resistance is the value when fixed with the above screws and torque. If fixed in any other way, this value may not be guaranteed. Please contact our sales representative for more information.

**Detachment of Adapter**

When removing the Adapter from the transmitter, after removing the small screw (M2), pull out the Adapter straight. Be careful when handling the transmitter pins, as they can bend easily. If the Adapter is difficult to pull out, insert a flat tool, such as a screwdriver blade, between the transmitter and Adapter and gradually separate both sides, one after the other.



**CAUTION**

If the pins become bent, use tweezers or similar tool to straighten them before use. Be careful, because inserting the Adapter when the pins are bent may damage the transmitter pins.

| Specifications                   |                                                                                                                                                                                                                                                                 |
|----------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>• Hardware Specifications</b> |                                                                                                                                                                                                                                                                 |
| Measuring Targets                | Thermocouples                                                                                                                                                                                                                                                   |
| Channels                         | 1                                                                                                                                                                                                                                                               |
| Compatible Thermocouples         | K, T, N, J<br>(Resistance of thermocouple: 500 $\Omega$ or less)                                                                                                                                                                                                |
| Measuring Range                  | K1300 -200 to 1300 °C<br>K500 -200 to 500 °C<br>K100 -100 to 100 °C<br>T400 -200 to 400 °C<br>T100 -100 to 100 °C<br>N1300 -200 to 1300 °C<br>N500 -200 to 500 °C<br>N100 -100 to 100 °C<br>J1200 -200 to 1200 °C<br>J500 -200 to 500 °C<br>J100 -100 to 100 °C |

| Measuring Accuracy  |                       |                                                                     |
|---------------------|-----------------------|---------------------------------------------------------------------|
| Ambient Temperature | Measuring Temperature | Telemeter Measuring Accuracy (Internal reference compensation mode) |
| 20 to 30 °C         | Below -50 °C          | Within $\pm 0.4$ %rdg $\pm 2.0$ °C                                  |
|                     | -50 °C or more        | Within $\pm 0.1$ %rdg $\pm 1.5$ °C                                  |
| 0 to 50 °C          | Below -50 °C          | Within $\pm 0.4$ %rdg $\pm 2.8$ °C                                  |
|                     | -50 °C or more        | Within $\pm 0.1$ %rdg $\pm 2.5$ °C                                  |
| -25 to 75 °C        | Below -50 °C          | Within $\pm 0.4$ %rdg $\pm 3.8$ °C                                  |
|                     | -50 °C or more        | Within $\pm 0.1$ %rdg $\pm 3.5$ °C                                  |

- \* The input terminal temperature is in equilibrium
- \* The above specifications apply to a stable temperature after warm up for about 60 minutes.

Check Functions  
AD Resolution 16 bits  
Sampling Frequency 50 Hz  
Operating Temperature and Humidity -25 to 75 °C, 20 to 85 % (non-condensing)  
Vibration Resistance 294.2 m/s<sup>2</sup> (30 G), 10 to 500 Hz  
Shock Resistance 980.7 m/s<sup>2</sup> (100 G) 11 ms or less, Half sine wave

Centrifugal Acceleration Resistance 29420 m/s<sup>2</sup> (3000 G)  
\* The figures are when installed with our specified screws and torque.  
\* Use a shatterproof cover for safety.  
Power Supply 2.2 to 4.4 VDC  
Current Consumption 24 mA or less  
\* Test condition: Power supply 3.0 V  
Hours of Continuous Use Approx. 33 h  
[Lithium (CR2 manufactured by Panasonic)]  
Approx. 30 h  
[Ni-MH eneloop® (BK-4MCC, AAA cell×2)]  
Approx. 45 h  
[Alkaline EVOLTA (LR03EJ, AAA cell×2)]  
\* Test conditions: 23 $\pm$ 5 °C

Dimensions 47 (W) x 7 (H) x 20 (D) mm  
Weight Approx. 17 g  
\* With adapter  
Compliance Directive 2014/53/EU (RED)  
Directive 2011/65/EU, (EU)2015/863 (10 restricted substances) (RoHS)

- **RF Specifications**  
Transceiver Frequency Channel 1  
(Choose 1 channel from 16 channels using Setting software)  
Antenna Built-in antenna  
Radio Communication Frequency Band 2.4 GHz Band  
Radio System Digital modulation system  
Radio Certification Japan, USA, China, India, Thailand, Taiwan and EU  
Communication Distance 50 m (Max. line of sight distance)  
Environment of Usage Environment where the wireless LAN and the Bluetooth®, etc. are not intermingled on the 2.4 GHz.

| Frequency Channel and Central Frequency |  | 0     | 1     | 2     | 3     | 4     | 5     | 6     | 7     |
|-----------------------------------------|--|-------|-------|-------|-------|-------|-------|-------|-------|
| Frequency Channel                       |  |       |       |       |       |       |       |       |       |
| Central Frequency (GHz)                 |  | 2.405 | 2.410 | 2.415 | 2.420 | 2.425 | 2.430 | 2.435 | 2.440 |

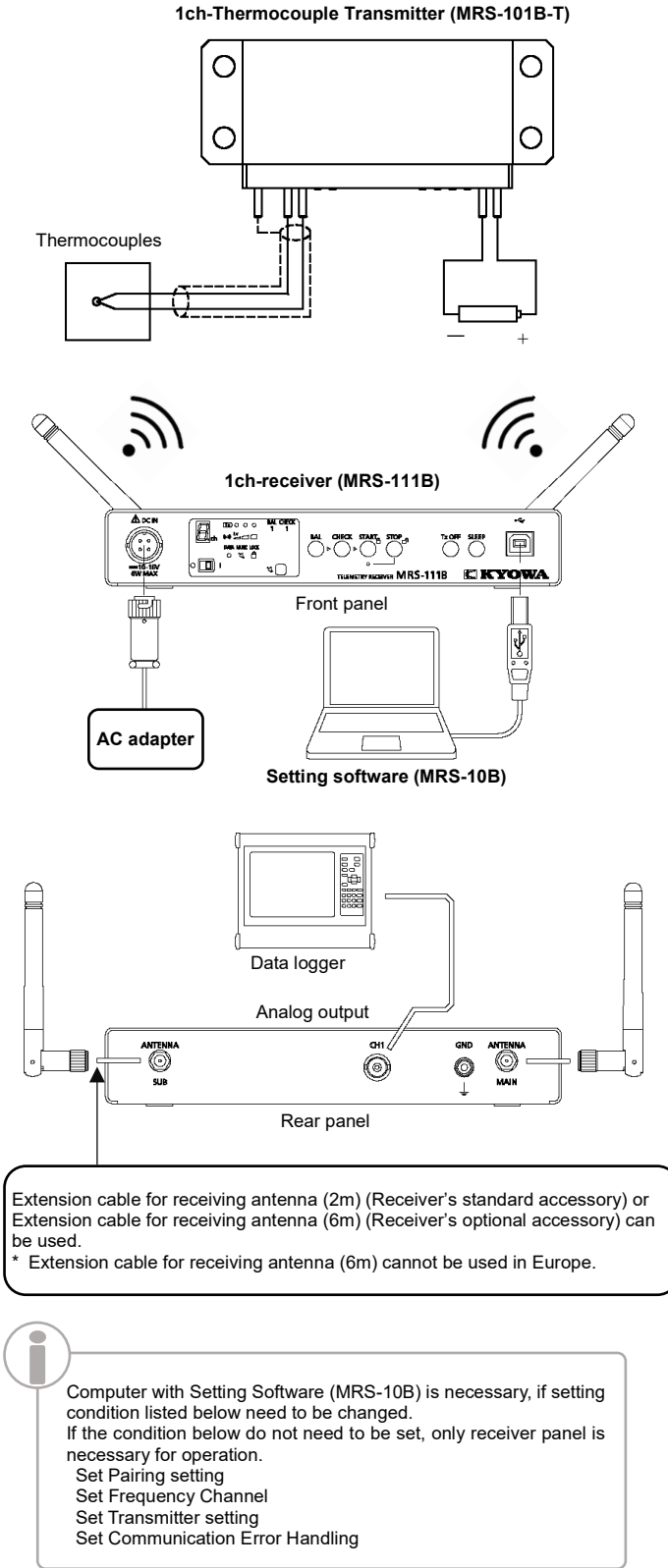
| Frequency Channel and Central Frequency |  | 8     | 9     | A     | B     | C     | D     | E     | F     |
|-----------------------------------------|--|-------|-------|-------|-------|-------|-------|-------|-------|
| Frequency Channel                       |  |       |       |       |       |       |       |       |       |
| Central Frequency (GHz)                 |  | 2.445 | 2.450 | 2.455 | 2.460 | 2.465 | 2.470 | 2.475 | 2.480 |

- **Specifications in Combination with Receiver**  
Compatible Receiver Models MRS-111A (-E) Firmware Ver. 3.01 or later  
MRS-111B Firmware Ver. 3.01 or later  
MRS-114A Firmware Ver. 3.01 or later  
Analog Output  $\pm 5$  V / Range Full Scale

| Measuring Range | Temperature Range | Analog Output Range |
|-----------------|-------------------|---------------------|
| K1300, N1300    | -200 to 1300 °C   | -0.7692 to 5.000 V  |
| K500, N500      | -200 to 500 °C    | -2.000 to 5.000 V   |
| K100, N100      | -100 to 100 °C    | -5.000 to 5.000 V   |
| T400            | -200 to 400 °C    | -2.500 to 5.000 V   |
| T100            | -100 to 100 °C    | -5.000 to 5.000 V   |
| J1200           | -200 to 1200 °C   | -0.8333 to 5.000 V  |
| J500            | -200 to 500 °C    | -2.000 to 5.000 V   |
| J100            | -100 to 100 °C    | -5.000 to 5.000 V   |

| Ambient Temperature | Measuring Temperature | Measuring Accuracy (Combination with Transmitter and Receiver) |                                                     |
|---------------------|-----------------------|----------------------------------------------------------------|-----------------------------------------------------|
|                     |                       | Below -50 °C                                                   | Within ( $\pm 0.4$ %rdg $\pm 2.0$ °C) $\pm 0.1$ %FS |
| 20 to 30 °C         | -50 °C or more        | Within ( $\pm 0.1$ %rdg $\pm 1.5$ °C) $\pm 0.1$ %FS            |                                                     |
|                     | Below -50 °C          | Within ( $\pm 0.4$ %rdg $\pm 2.8$ °C) $\pm 0.1$ %FS            |                                                     |
| 0 to 50 °C          | -5                    |                                                                |                                                     |

Telemeter Configuration



Radio Certification

The product is for use only in the following countries and regions.  
Use in other countries or regions is prohibited.

• IMPORTANT REGULATORY INFORMATION

JAPAN (MIC)

Type certification  
The product has been certified as a low-power data communications system in the 2.4 GHz band (Technical Regulations Conformity Certification System: Ordinance of MPT No. 37, 1981, Article 2, paragraph 1, item (19)) according to the Radio Law of Japan. Accordingly, no radio equipment license is required to use this product. However, the following actions may be punishable under law:  
• Disassembling or modifying the product.  
• Removing the certification label on the product.  
Name of radio equipment: MR-2400M Number of type certification: 007-AE0235

USA (FCC)

COMPLIANCE WITH ELECTRIC DIRECTIVES & REGULATIONS  
This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.  
[CAUTION]  
Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.  
Contains Transmitter Module  
FCC ID: 2AJE9, MR-2400MA  
This device should be used EXCLUSIVELY as the digital devices for industrial, commercial or medical test equipment. "Test equipment" includes devices used for maintenance, research, evaluation, simulation and other analytical or scientific applications in areas such as industrial plants, public utilities, hospitals, universities, laboratories, automotive service centers and electronic repair shops.

CHINA

REGULATORY INFORMATION in China  
MRS-100 系列产品符合《微功率短距离无线电发射设备目录和技术要求》的无线电发射设备，无需取得无线电频率使用许可，无线电台执照，无线电发射设备型号核准。使用时请注意以下几点。  
(一) 符合“微功率短距离无线电发射设备目录和技术要求”的具体条款和使用场景，采用的天线类型和性能，控制、调整及开关等使用方法；  
(二) 不得擅自改变使用场景或使用条件、扩大发射频率范围、加大发射功率(包括额外加装射频功率放大器)，不得擅自更改发射天线；  
(三) 不得对其他合法的无线电台(站)产生有害干扰，也不得提出免受有害干扰保护；  
(四) 应当承受辐射射频能量的工业、科学及医疗(ISM)应用设备的干扰或其他合法的无线电台(站)干扰；  
(五) 如对其他合法的无线电台(站)产生有害干扰时，应立即停止使用，并采取措施消除干扰后方可继续使用；  
(六) 在航空器内和依据法律法规、国家有关规定、标准划设的射电天文台、气象雷达站、卫星地球站(含测控、测距、接收、导航站)等军民用无线电台(站)、机场等的电磁环境保护区域内使用微功率设备，应当遵守电磁环境保护及相关行业主管部门的规定；  
(七) 禁止在以机场跑道中心点为圆心、半径 5000 米的区域内使用各类模型遥控器；  
(八) 微功率设备使用时温度和电压的环境条件。

INDIA (WPA)

REGULATORY INFORMATION in India  
Each model of WPC ETA ID is;  
MRS-111B : ETA-SD-20210805603  
MRS-114A : ETA-SD-20191207195  
MRS-101A-SE : ETA-SD-20191207189  
MRS-104A-S : ETA-SD-20191207137  
MRS-101B-T : ETA-SD-20210805601  
MRS-101B-S : ETA-SD-20210805604  
MRS-101B-V : ETA-SD-20210805605

THAILAND (NBTC)

REGULATORY INFORMATION in Thailand  
เครื่องโทรคมนาคมและอุปกรณ์นี้ มีความสอดคล้องตามข้อกำหนดของ กสทช.

TAIWAN (NCC)

REGULATORY INFORMATION in Taiwan.  
Contains the following NCC ID  
MRS-111B and MRS-114A  
內含發射器模組：◎CCAQ21LP0050T3  
MRS-101A-SE ◎CCAQ21LP0060T6  
MRS-104A-S ◎CCAQ21LP0070T9  
MRS-101B-T ◎CCAQ21LP0080T2  
MRS-101B-S ◎CCAQ21LP0081T1  
MRS-101B-V ◎CCAQ21LP0082T3

取得審驗證明之低功率射頻器材，非經核准，公司、商號或使用者均不得擅自變更頻率、加大功率或變更原設計之特性及功能。低功率射頻器材之使用不得影響飛航安全及干擾合法通信；經發現有干擾現象時，應立即停用，並改善至無干擾時方得繼續使用。前述合法通信，指依電信管理法規定作業之無線電通信。低功率射頻器材須忍受合法通信或工業、科學及醫療用電波輻射性電機設備之干擾。

EU

Hereby, Kyowa Electronic Instruments Co., Ltd., declares that each equipment of the MRS-100 series is in compliance with Directive 2014/53/EU in countries of the European Economic Area (EEA) and EFTA countries (Iceland, Norway, Liechtenstein, Switzerland) and Turkey.

|                           |                                                                                                                                         |
|---------------------------|-----------------------------------------------------------------------------------------------------------------------------------------|
| English:                  | This equipment is in compliance with the essential requirements and other relevant provisions of Directive 2014/53/EU.                  |
| Česky<br>[Czech]:         | Toto zařízení je v souladu se základními požadavky a ostatními odpovídajícími ustanoveními Směrnice 2014/53/EU.                         |
| Deutsch:<br>[German]:     | Dieses Gerät entspricht den grundlegenden Anforderungen und den weiteren entsprechenden Vorgaben der Richtlinie 2014/53/EU.             |
| Dansk:                    | Dette udstyr er i overensstemmelse med de væsentlige krav og andre relevante bestemmelser i Directiv 2014/53/EU.                        |
| Español<br>[Spain]:       | Este equipo cumple con los requisitos esenciales así como con otras disposiciones de la Directiva 2014/53/EU.                           |
| Français<br>[France]:     | Cet appareil est conforme aux exigences essentielles et aux autres dispositions pertinentes de la Directive 2014/53/EU.                 |
| Ελληνική<br>[Greek]:      | Αυτός ο εξοπλισμός είναι σε συμμόρφωση με τις ουσιαστικές απαιτήσεις και άλλες σχετικές διατάξεις της Οδηγίας 2014/53/ΕΕ                |
| Italiano<br>[Italian]:    | Questo apparato é conforme ai requisiti essenziali ed agli altri principi sanciti dalla Direttiva 2014/53/UE.                           |
| Magyar<br>[Hungarian]:    | Ez a készülék teljesíti az alapvető követelményeket és más 2014/53/EU irányelvben meghatározott vonatkozó rendelkezéseket.              |
| Nederlands<br>[Dutch]:    | Dit apparaat voldoet aan de essentiële eisen en andere van toepassing zijnde bepalingen van de Richtlijn 2014/53/EU.                    |
| Norsk<br>[Norwegian]:     | Dette utstyret er i samsvar med de grunnleggende krav og andre relevante bestemmelser i EU-directiv 2014/53/EU.                         |
| Português:                | Este equipamento satisfaz os requisitos essenciais e outras provisões da Directiva 2014/53/EU.                                          |
| Română<br>[Romanian]:     | Acest echipament este în conformitate cu cerințele esențiale și cu alte prevederi relevante ale Directivei 2014/53/UE.                  |
| Slovensko<br>[Slovenian]: | Ta naprava je skladna z bistvenimi zahtevami in ostalimi relevantnimi pogoji Direktive 2014/53/EU.                                      |
| Slovensky<br>[Slovak]:    | Toto zariadenie je v zhode so základnými požiadavkami a inými príslušnými nariadeniami direktív: 2014/53/EU.                            |
| Suomi<br>[Finnish]:       | Tämä laite täyttää direktiivin 2014/53/EU olennaiset vaatimukset ja on siinä asetettujen muiden laitetta koskevien määräysten mukainen. |
| Svenska<br>[Swedish]:     | Denna utrustning är i överensstämmelse med de väsentliga kraven och andra relevanta bestämmelser i Direktiv 2014/53/EU.                 |

The full declaration of conformity for this product can be found at  
[http://www.kyowa-ci.com/eng/company/environment/eu\\_declaration.html](http://www.kyowa-ci.com/eng/company/environment/eu_declaration.html).

The maximum RF power is below:  
The band 2405 - 2480 MHz is 4.0dBm

When mounting the product in customersr systems, it is required to proceed additional certification processes before placing on the market in EU member states to make customers products fully comply with relative EU standards.  
Kyowa can provide a test report of conducted measurement portion for the radio module to customers. Customers can utilize the test report for the certification processes of own systems as it requires radio.